

TRACING THE EVOLUTIONARILY DISTINCTIVENESS OF *PEROMYSCUS* *MANICULATUS* IN WYOMING

Valorie Lyman, Dr. Hayley Lanier
University of Wyoming at Casper



Acknowledgements

I would like to thank:

Yellowstone folks:

Zachary Roehrs

Meredith Roehrs

Scott Seville

Ashkia Campbell

Andy Kulikowski

Kevin Crouch-Jacobs

Samantha Haller

Dominique Schlumpf

Kayla Wilson

Jennifer Forrester

for collecting

Yellowstone samples

UW-Casper Conservation
Biology Course for skinning
Casper samples and
providing tissue samples

Nathan Stack for
providing assistance in
the lab

Hayley Lanier for all her
guidance, expertise, and
advice in doing this project



Wyoming INBRE
program



National Park Service
(NPS)

Acknowledgements

I would like to thank:
Freya and Sparky,
Dr. Lanier's cats
for collecting
the samples
on Casper Mountain



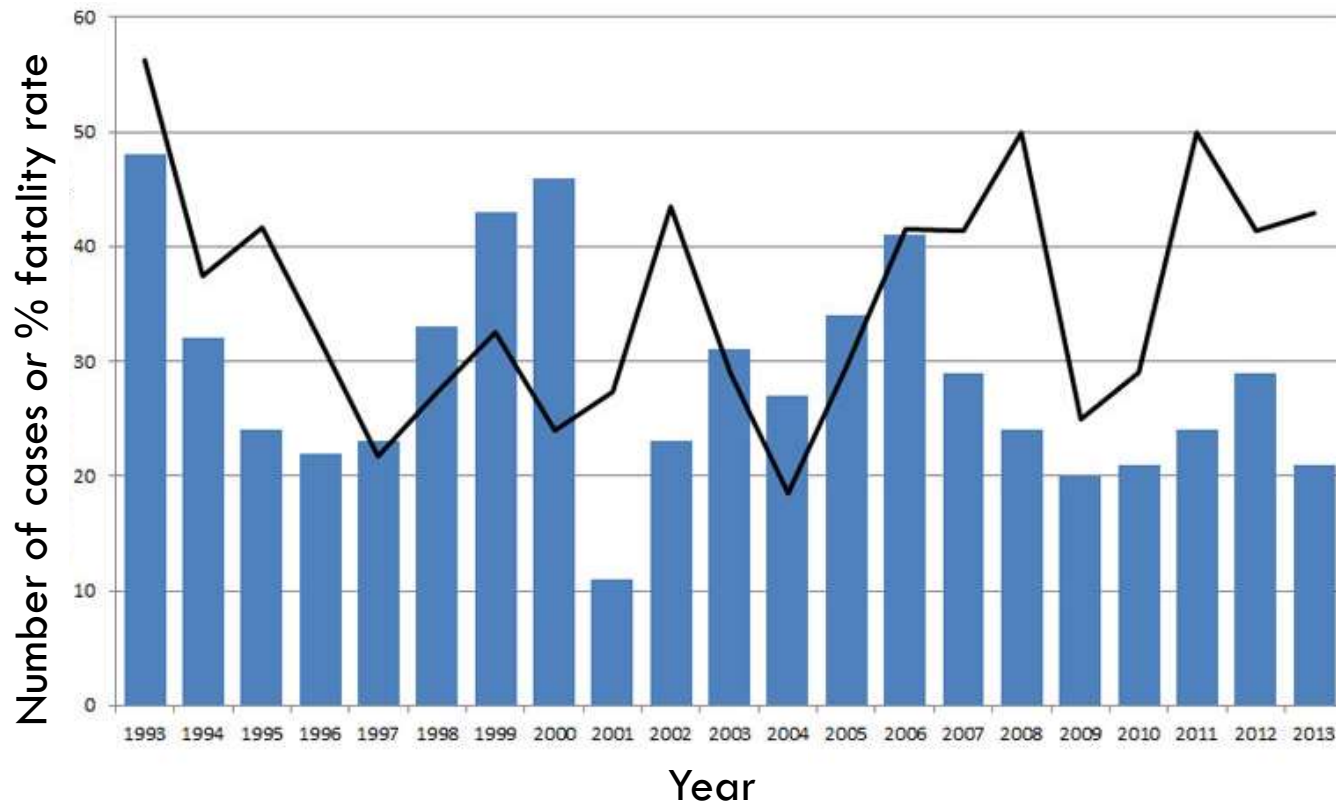
Distribution

- *Peromyscus maniculatus* is one of the most widely distributed mammals in North America
- Found in many habitats and across the widest elevation range of any mammal



Disease Transmission

Across their distribution *Peromyscus maniculatus* is the host of at least two strains of Hantavirus, the Sin Nombre Virus in Western range and Monongahela Fever in Eastern range

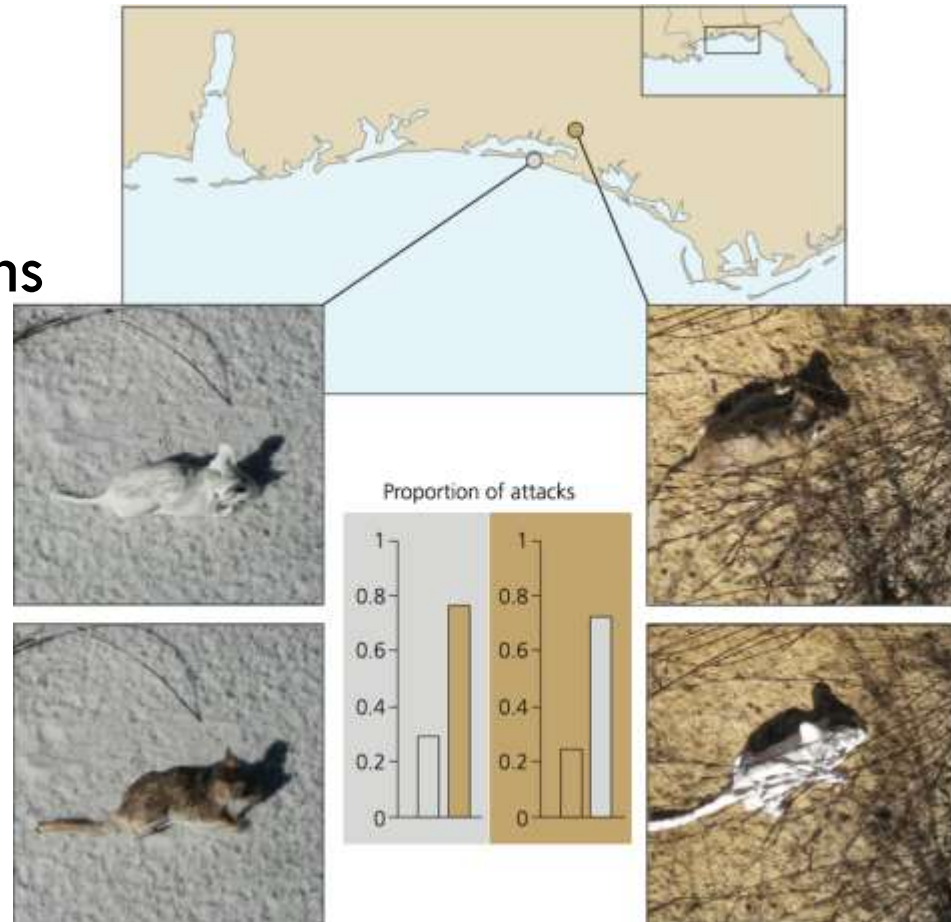


Annual number of cases (bars) and case-fatality (line) for hantavirus pulmonary syndrome, United States, 1993-2013

Peromyscus as a model species

□ Evolution of Hemoglobin oxygen affinity in high mountains

□ Evolution of coloration on different substrates in the *Peromyscus maniculatus* species complex





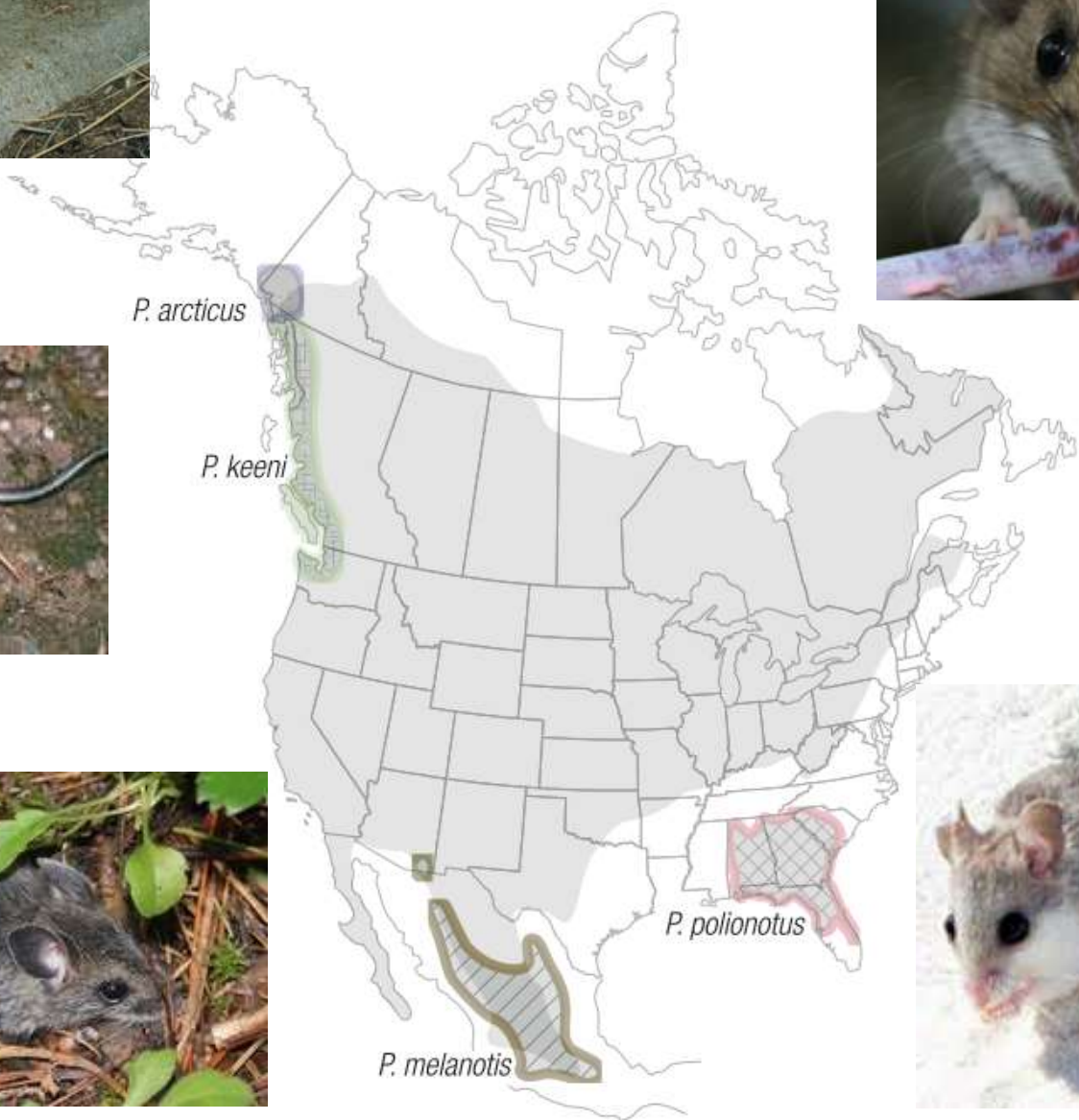
P. arcticus



P. maniculatus



P. keeni



P. melanotis



P. polionotus

Research in Wyoming

Yellowstone National Park Samples

- 5 samples collected from this site

Casper Mountain Samples

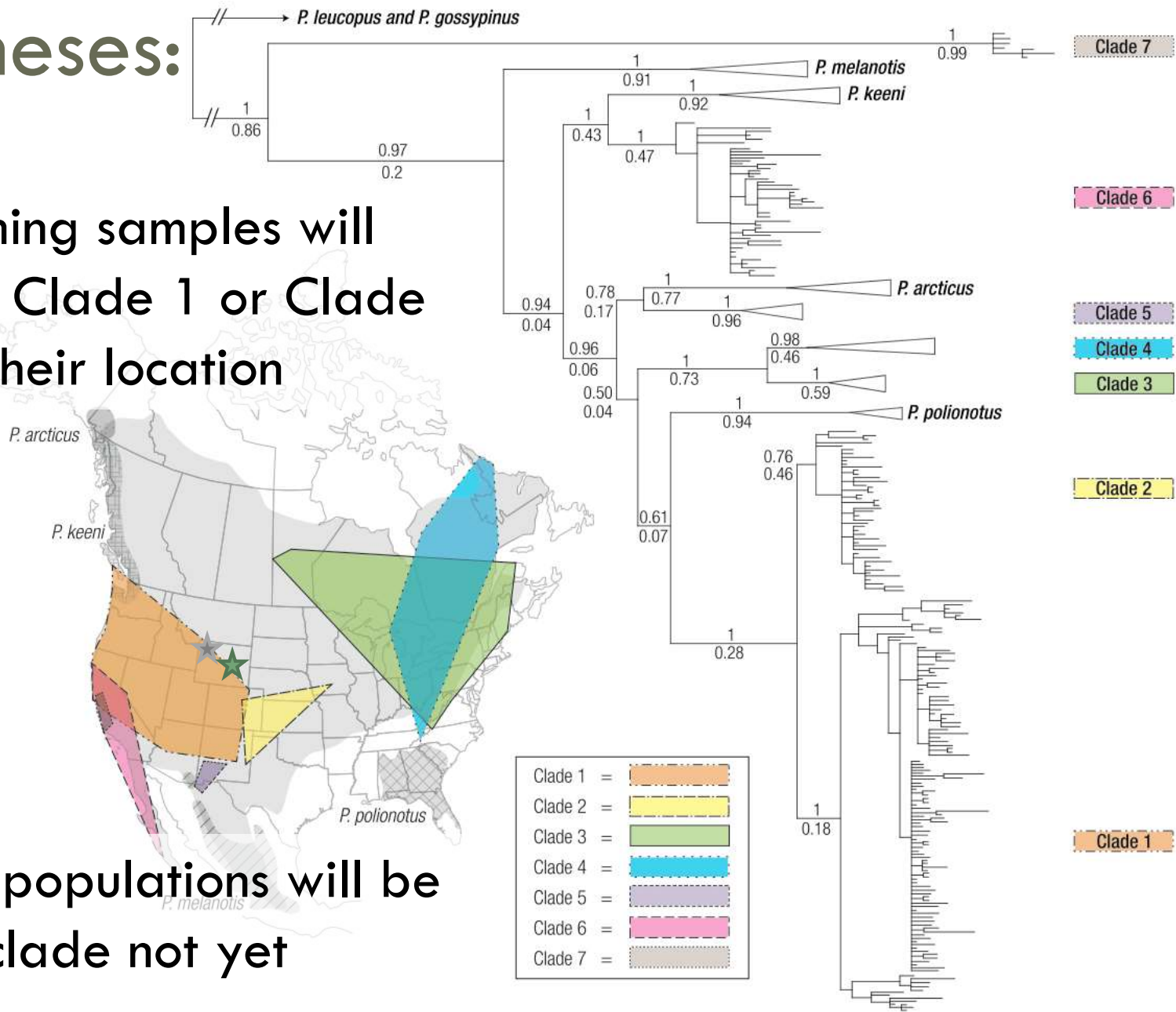
- 16 samples collected at this site



Hypotheses:

H₀: Wyoming samples will fall within Clade 1 or Clade 2 due to their location

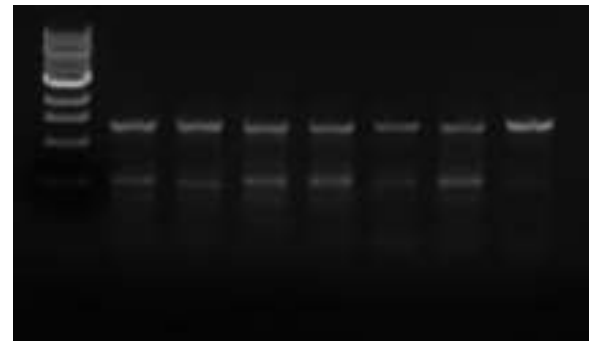
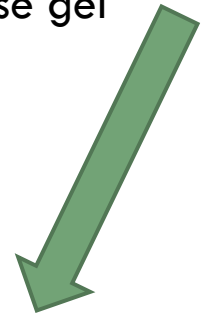
H₁: These populations will be in a new clade not yet described



Methods- Lab



Polymerase Chain Reaction (PCR) to amplify mtDNA and gel electrophoresis to run out PCR on agarose gel



Send successful samples off for sequencing at Macrogen

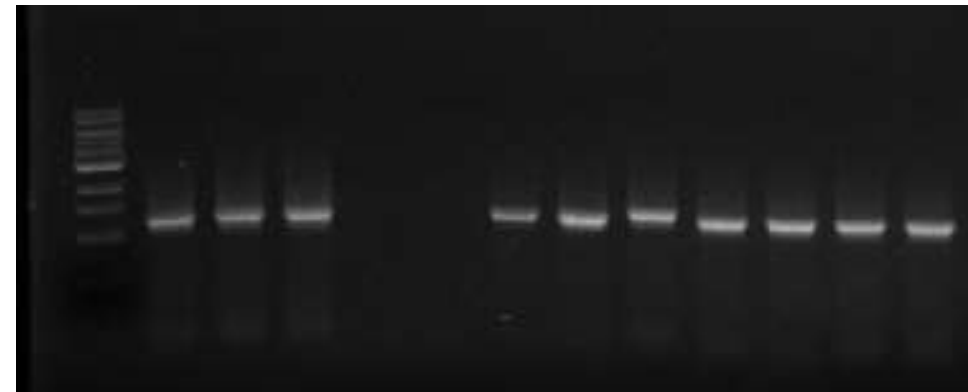
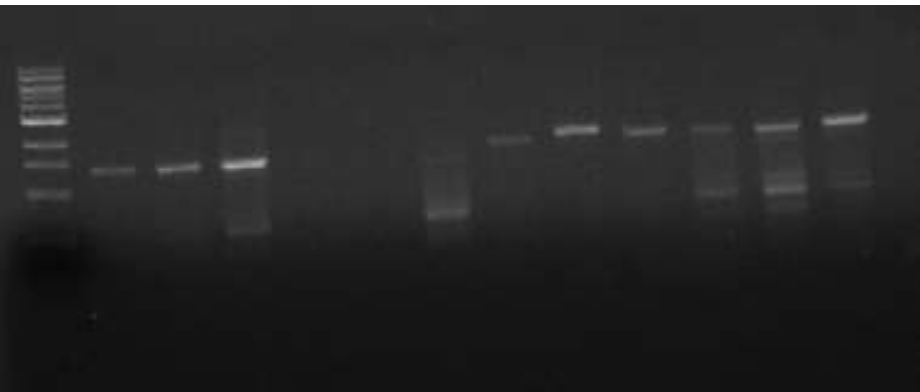
Visual DNA on gels using BioRad Transilluminator

Polymerase Chain Reaction

External Primers



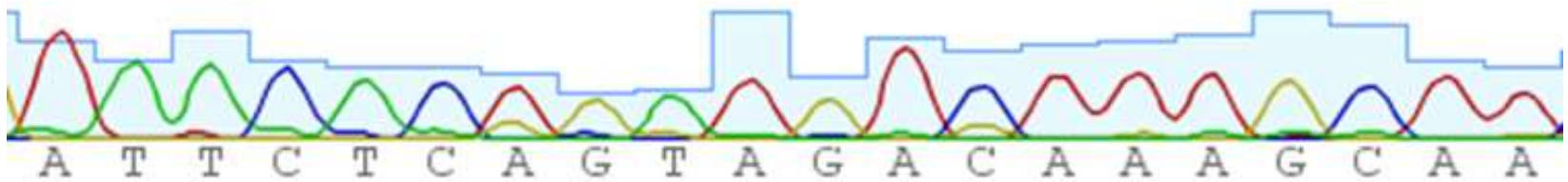
Internal primers



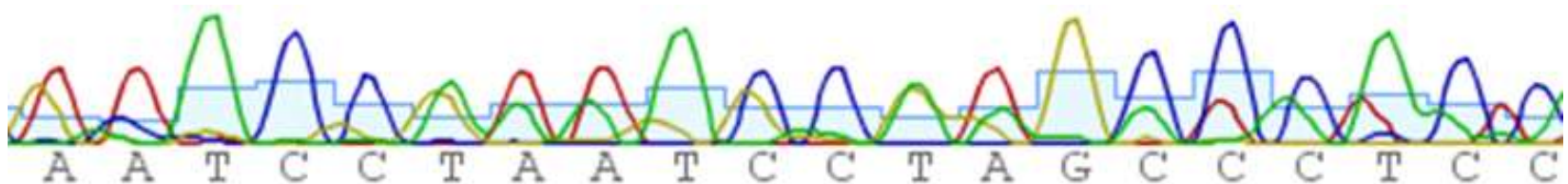
Methods-Analysis

Clean sequence

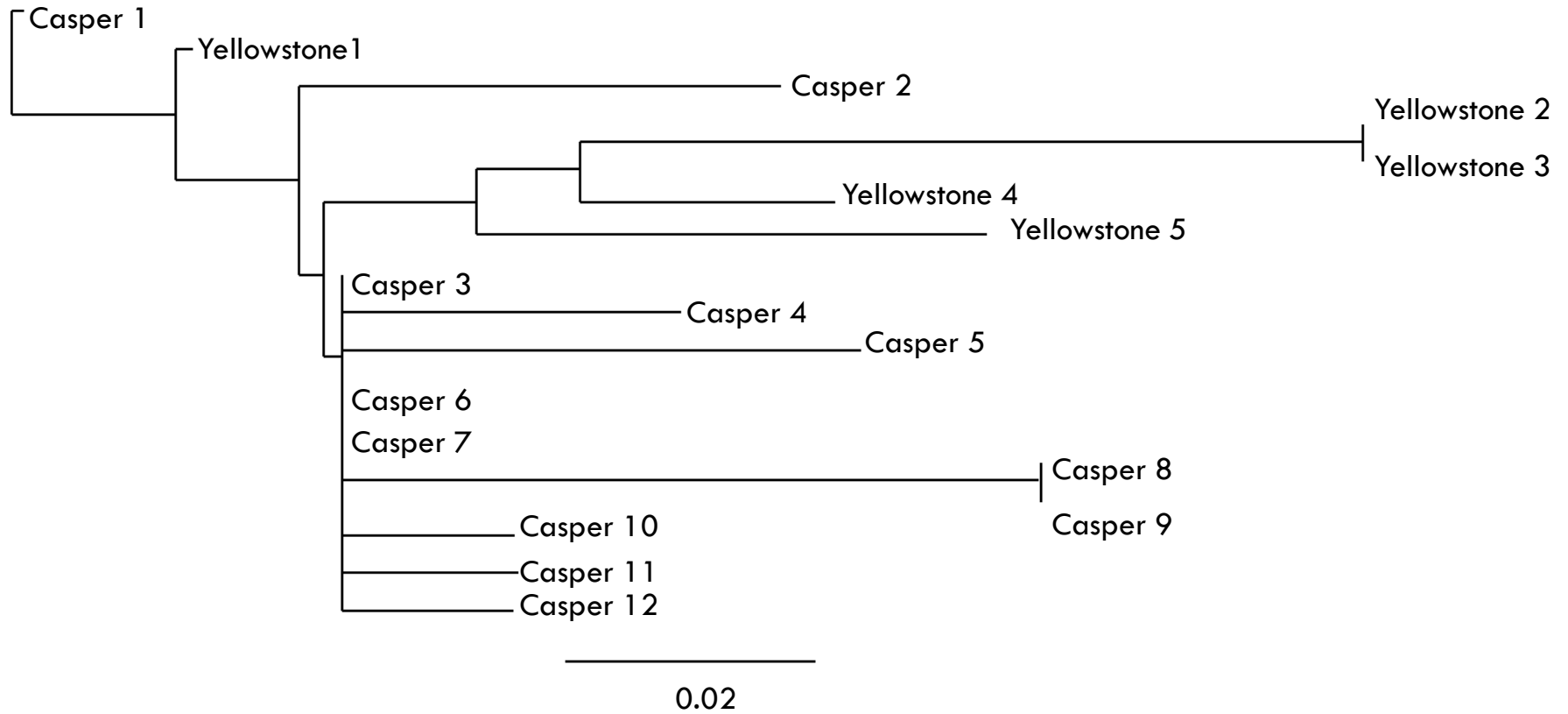
Red-Adenine
Green-Thymine
Blue-Cytosine
Yellow-Guanine



Troublesome sequence



Wyoming tree



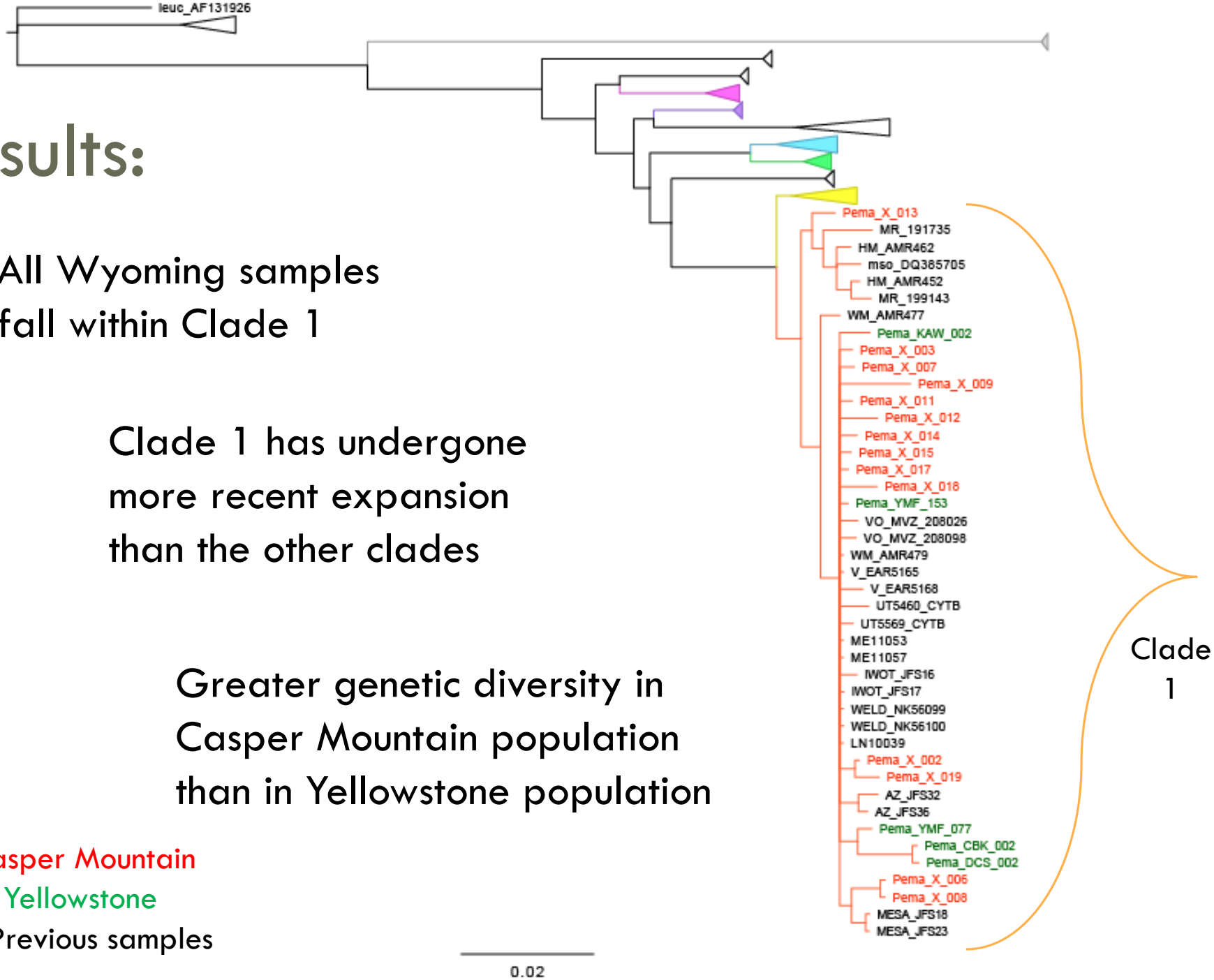
Results:

All Wyoming samples fall within Clade 1

Clade 1 has undergone more recent expansion than the other clades

Greater genetic diversity in Casper Mountain population than in Yellowstone population

Red- Casper Mountain
Green- Yellowstone
Black- Previous samples sites



Hypothesis supported

